Claim Listing

1. (Currently Amended) A catalytic polymerization process, comprising:

reacting free radically (co)polymerizable acidic monomers utilizing a suitable transition metal complex as a catalyst, wherein the suitable transition metal complex has acidity constants of the protonated ligand greater than 10^{-4} and conditional disproportionation constant than less than 1000.

2. (Previously Presented) The process of claim 1, wherein the transition metal complex comprises a suitable heterodonor ligand.

3. (Original) The process of claim 2, wherein the heterodonor ligand is a bidentate or a multidentate ligand.

4. (Original) The process of claim 3, wherein the heterodonor ligand comprises at least two donor atoms each independently selected from the group consisting of oxygen, sulfur, selenium, tellurium, nitrogen, phosphorus, arsenic, antimony, and bismuth.

5. (Currently Amended) The process of claim 2, wherein the heterodonor ligand comprises a donor atom that cannot be protonated at a pH of more than 90% of the pH value of the reaction mixture.**[[.]]**

6. (Original) The process of claim 4, wherein ligand comprises a sulfur atom.

7. (Original) The process of claim 5, wherein the heterodonor ligand comprises a sulfur atom and at least one oxygen atom.

8. (Original) The process of claim 2, wherein the ligand comprises a charged species.

9. (Original) The process of claim 7, wherein the charged species is a phenoxide or a carboxylate.

10. (Original) The process of claim 1, wherein the catalytic process is conducted in a polar media.

11. (Original) The process of claim 10, wherein the polar media comprises at least one of water and an alcohol.

12. (Original) The process of claim 11, wherein the alcohol is at least one of methanol, ethanol, and propanol.

13. (Original) The process of claim 1, wherein the catalytic reaction is an atom transfer radical polymerization process.

14. (Original) The process of claim 13, wherein the atom transfer radical polymerization is conducted in an polar medium.

15. (Original) The process of claim 14, wherein the polar medium comprises at least one of water, and alcohols.

16. (Original) The process of claim 1, wherein the suitable catalyst has sufficient solubility, redox potential, stability towards ionic species, conditional radically transferable atom phylicity, and conditional metal-radically transferable atom or group phylicity to act as a catalyst in the reaction media.

17. (Original) The process of claim 1, wherein the suitable catalyst has sufficient solubility, redox potential of less than 500mV, acidity constants of the protonated ligand greater than 10^{-4}, conditional disproportionation constant than less than 1000, and conditional metal-radically transferable atom or group phylicity of greater than 10.

18. (Previously Presented) The process of claim 1, wherein the catalyst is a suitable single entity catalyst.

19. (Previously Presented) The process of claim 18, wherein the transition metal catalyst comprises a donor atom that cannot be protonated more than 90%, at the pH value of the reaction mixture.

20. (Original) The process of claim 19, wherein ligand comprises a sulfur atom.

21. (Original) The process of claim 20, wherein the catalyst comprises a heterodonor ligand.

22. (Original) The process of claim 21, wherein the ligand comprises a charged species.

23. (Original) The process of claim 22, wherein the charged species is a phenoxide or a carboxylate.

24. (Original) The process of claim 18, wherein the catalytic process is conducted in a polar media.

25. (Original) The process of claim 24, wherein the polar media comprises at least one of water and an alcohol.

26. (Original) The process of claim 25, wherein the alcohol is at least one of methanol, ethanol, and isopropanol.

27. (Original) The process of claim 26, wherein the catalytic reaction is an atom transfer radical polymerization process.

28. (Original) The process of claim 27, wherein the atom transfer radical polymerization is conducted in an polar medium.

29. (Original) The process of claim 28, wherein the polar medium comprises at least one of water, alcohols, and methanol.

30. (Original) The process of claim 18, wherein the suitable catalyst has sufficient solubility, redox potential, stability towards ionic species, conditional radically

transferable atom phylicity, and conditional metal-radically transferable atom or group phylicity to act as a catalyst in the reaction media.

31. (Original) The process of claim 18, wherein the suitable catalyst has sufficient solubility, redox potential of less than 500mV, acidity constants of the protonated ligand greater than 10^{-4}, conditional disproportionation constant than less than 1000, and conditional metal-radically transferable atom or group phylicity greater than 10.

32. (Currently Amended) A catalytic polymerization process, comprising:

reacting free radically (co)polymerizable acidic monomers utilizing a suitable transition metal complex as a catalyst, wherein the catalytic polymerization process is conducted in a polar media, wherein the suitable transition metal complex has acidity constants of the protonated ligand greater than 10^{-4} and conditional disproportionation constant than less than 1000.

33. (Previously Presented) The process of claim 32, wherein the transition metal complex comprises a suitable heterodonor ligand.

34. (Original) The process of claim 33, wherein the heterodonor ligand is a bidentate or a multidentate ligand.

35. (Previously Presented) The process of claim 34, wherein the heterodonor ligand comprises at least two donor atoms each independently selected from the group consisting of oxygen, sulfur, selenium, tellurium, nitrogen, phosphorus, arsenic, antimony, and bismuth.

36. (Previously Presented) The process of claim 33, wherein the heterodonor ligand comprises a donor atom that cannot be protonated more than 90% at the pH value of the reaction mixture.

37. (Original) The process of claim 36, wherein ligand comprises a sulfur atom.

38. (Original) The process of claim 37, wherein the heterodonor ligand comprises a sulfur atom and at least one oxygen atom.

39. (Original) The process of claim 33, wherein the ligand comprises a charged species.

40. (Original) The process of claim 39, wherein the charged species is a phenoxide or a carboxylate.

41. (Original) The process of claim 32, wherein the polar media comprises at least one of water and an alcohol.

42. (Original) The process of claim 41, wherein the alcohol is at least one of methanol, ethanol, and propanol.

43. (Original) The process of claim 32, wherein the catalytic reaction is an atom transfer radical polymerization process.

44. (Original) The process of claim 32, wherein the suitable catalyst has sufficient solubility, redox potential, stability towards ionic species, low propensity to disproportionation, and conditional metal-radically transferable atom or group phylicity to act as a catalyst in the reaction media.

45. (Original) The process of claim 32, wherein the suitable catalyst has sufficient solubility, redox potential of less than 500mV, acidity constants of the protonated ligand greater than 10^{-4}, conditional disproportionation constant than less than 1000, and conditional metal-radically transferable atom or group phylicity greater than 10.

46. (Withdrawn) A process for elimination of the radically transferable atom or group from the active chain termini, comprising:

heating a polymer comprising a radically transferable atom or group in an aqueous media in the presence of an acid and a transition metal catalyst to allow hydrolysis of the end group.

47. (Withdrawn) A process for elimination of the radically transferable atom or group from the active chain termini in an aqueous ATRP process, comprising: heating a polymer comprising a radically transferable atom or group in an aqueous media in the presence of an base and a transition metal catalyst to allow dehydrohalogenation of the end group.